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REPORT ON DRY-FARMING INVESTIGATIONS IN LILLOOET AND NICOLA DISTRICTS.

By PROFESSOR W. J. ELLIOTT.

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REPORT ON DRY FARMING INVESTIGATIONS IN LILLOOET AND NICOLA DISTRICTS.

BY PROFESSOR W. J. ELLIOTT.

December 21st, 1915.

*Hon. William R. Ross, K.C.,
Minister of Lands, Victoria, B.C.*

Sir,—I have the honour to submit herewith a report covering the experimental work undertaken on the Dry Farm at 105-Mile House on the Cariboo Trail, and at Quilchena, located on the Commonage south of Nicola, B.C. As will be remembered, the experiments were begun at your direction during June, 1913, the purpose being to determine the value of certain so called dry areas of British Columbia for agricultural and settlement purposes. The report covers the period from September 1st, 1914, to August 31st, 1915, and includes a full record of the crops grown during the summer of 1915.

While the present report deals particularly with the record of the crops grown during the past summer, yet we may frequently refer to the 1914 results that appeared in your report for the Department of Lands for last year, so that we may have a comparison of results. For it must be borne in mind that it is only an average over a series of years that gives accuracy to records of this kind.

This report, like last year's, includes the records of rainfall and snowfall, temperature records, and, in addition, actual records obtained by the growing of a variety of crops under various conditions. Some of the results of last year suggested that we might with profit undertake a "date of seeding" experiment with certain grains, and also a "time of seeding" experiment. These were tried out this year on both farms, and the results will be found properly tabulated below.

105-MILE FARM REPORT.

PREPARATION OF SOIL AT 105-MILE HOUSE.

The land for the 1915 crop was broken during the spring and early summer of 1914, and as it was all native sod the results recorded below are those of the first crop grown upon the land. The ploughing had been done very thoroughly, and the frequent cultivations that were given during the summer prepared a very excellent seed-bed. The last thing in the fall all of the slopes were run over the disk by facing each pair of disk-blades toward each other. This was done crosswise of the slopes, the purpose being to catch as much as possible of the melting snow in the spring. The plan was very successful, as the foremen report that very seldom, if ever, did the snow-water in the depressions break through the small ridges left by the disk to run off the land and be lost for the crop.

CHARACTER OF SPRING AT 105-MILE HOUSE.

The spring of 1915, like the spring of 1914, opened up with a considerable amount of cold, backward weather. There was also much more wind than in 1914, and it was feared that this wind might make a heavy draught upon the stored-up moisture on our cultivated fields, but the results that are herewith given are splendid evidence of the fact that the cultivation had been thoroughly accomplished.

In comparing April, 1915, with April, 1914, we find that the former was, on the average, slightly cooler than the latter. The average maximum and minimum temperatures respectively for 1914 were 50.5 and 31.8 degrees, while the corresponding averages for 1915 were 48.7 and 29.6 degrees. For the same month the highest and lowest temperatures recorded during 1914 were 66 and 22 degrees respectively, while the corresponding highest and lowest for 1915 were 58 and 24 degrees. The above figures are mentioned particularly because April is the principal seeding month for both wheat and oats. The lower temperatures for 1915 as compared with 1914 seem to have no evil effect upon the proper germination and sprouting of the grain, and upon the final very excellent results that were obtained with practically all crops grown.

PRECIPITATION AT 105-MILE HOUSE.

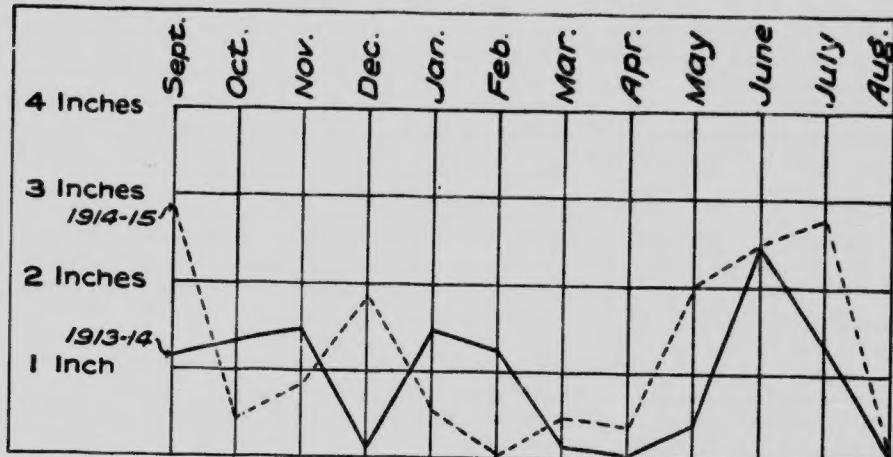
The general impression is that the precipitation for 1915 was greatly in excess of that of 1914, and while there is more precipitation recorded at the 105-Mile Station for 1915 than for 1914, the excess is not nearly as large as is imagined. The following table gives the precipitation at 105-Mile House by months, from September 1st, 1913, to August 31st, 1914, as compared with that from September 1st, 1914, to August 31st, 1915:

Table 1.—Precipitation by Months.

Month.	Precipitation from Sept. 1st, 1913, to Aug. 31st, 1914.	Precipitation from Sept. 1st, 1914, to Aug. 31st, 1915.	Month.	Precipitation from Sept. 1st, 1913, to Aug. 31st, 1914.	Precipitation from Sept. 1st, 1914, to Aug. 31st, 1915.
September	1.08	2.92	April .....	...	0.3
October	1.34	0.39	May	0.35	2.07
November	1.37	0.9	June	2.64	2.6
December .....	...	1.9	July	1.32	2.83
January	1.41	0.5	August .....	...	0.2
February	1.23	...	Totals	10.04	15.05
March	0.2	0.44			

It will thus be seen that the precipitation for 1914-15 is not nearly as large as popular opinion would suggest. As a matter of fact, it is only 4.11 inches greater than for the corresponding months of 1913-14, and in any event 15.05 inches (the total for twelve months) is regarded as a comparatively light rainfall. There are one or two significant facts about the rainfall as given above, and to bring this out more clearly it will be better to put these figures in the form of a chart or diagram. In this way the various points may be seen much more clearly. In the following chart the precipitation by months will be given. The figures representing September 1st, 1913, to August 31st, 1914, will appear as a straight line, while those representing September 1st, 1914, to August 31st, 1915, will appear as a dotted line.

Chart 1.—Showing Monthly Precipitation from September 1st, 1913, to August 31st, 1914, as compared with that from September 1st, 1914, to August 31st, 1915.



The two records as they appear in the above diagram are alike, generally speaking, in the fact that the precipitation is light from the end of September to the end of May. During the winter of 1913-14 most of the snow came in January and the early part of February, while in 1914-15 the majority of the snow came in December. This variation is no more than that which occurs in any part of the Western Provinces.

During March, and particularly during April and the fore part of May, rainfall is comparatively light, which is an advantageous thing, as April and the fore part of May are the seeding months. A light precipitation is desirable, as there would, therefore, be little to interfere with the cultivation, etc., necessary for an early seeding. But the most significant fact is noted in the high precipitation during the months of May, June, and July, or the months that are the growing and filling months for the grain. It will be noted that during 1915 May, June, and July have each over 2 inches of precipitation. This is more than was received during the corresponding months of 1914. However it will be seen that in both years good rains fell in May, June, and July, or just when the crops needed them most for proper filling and maturing.

AVERAGE TEMPERATURE BY MONTHS AT 105-MILE HOUSE.

In this table a comparison is also given between the average temperatures from September 21st, 1913, to August 31st, 1914, and those from September 1st, 1914, to August 31st, 1915.

Table 2.—Average Temperatures for Corresponding Months during 1913-14 and 1914-15.

Month of Year.	Average Daily Maximum.		Average Daily Minimum.		Average Daily Maximum.		Average Daily Minimum.	
	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.
September	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.
September	65.1	57.5	39.3	38.7	78.0	74.0	44.0	31.0
October	52.2	51.7	26.2	32.5	64.0	66.0	16.0	22.0
November	39.3	30.9	21.4	23.5	49.0	53.0	4.0	3.0
December	35.0	21.4	26.5	10.6	46.0	33.0	8.0	-9.0
January	27.1	20.9	16.1	9.6	30.0	37.0	-13.0	-9.0
February	31.9	35.4	27.8	18.3	43.0	45.0	3.0	7.0
March	35.2	43.4	19.1	25.0	54.0	55.0	1.0	11.0
April	50.5	54.1	31.8	32.1	66.0	67.0	22.0	8.0
May	55.2	56.1	35.1	37.6	82.0	72.0	27.0	29.0
June	68.1	61.8	38.3	40.8	82.0	74.0	31.0	34.0
July	78.1	68.5	39.2	46.8	85.0	82.0	30.8	39.0
August	78.4	76.4	37.3	48.9	84.0	85.0	31.0	40.0
Average	51.42	49.17	29.84	30.37	64.3	61.9	17.0	18.7

From the above table it will be noted that the average daily maximum for 1913-14 is higher than that for 1914-15 by 2.25 degrees, while the average daily minimum for the corresponding period is in favour of 1914-15 by 0.53 degree. In other words, the average day temperature of 1913-14 was higher than the day temperature of 1914-15 by 2.25 degrees, while the average night temperature for 1914-15 was higher than that of 1913-14 by 0.53 degree. There is this general statement to be made regarding the temperature at 105-Mile House, and that is, it seems to be well adapted to the production of splendid crops, as both those of 1914 and those of 1915 have abundantly demonstrated.

CROPS GROWN AT 105-MILE HOUSE.

All of the seed used for experimental work at 105-Mile House was produced on the farm last year, and consequently is home-grown seed.

The general spring conditions were quite favourable for the seeding and germination of the grain, and it is interesting now to turn to the actual results from the various crops to see the splendid records obtained at 105-Mile House.

WHEAT.

The following chart gives particulars regarding the various wheat-crops grown with respect to date of seeding, rate of seeding, date cut, days to mature, yield per plot, and corresponding yield per acre:—

Table 3.—Giving Full Particulars regarding the Variety of Wheat Test.

Variety of Wheat.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
		Lb.				Acre.	Lb.	Bu. lb.
Marquis	April 22	60	July 4	Aug. 24	124	1/4	602	60 2
Huron	" 17	60	" 2	" 18	123	1/4	770	51 20
Durum	" 22	48	" 3	" 26	120	1/4	750	50 30
Red Fife	" 17	60	" 5	" 26	131	1/4	681	45 20
Galgalos	May 15	40	" 14	Sept. 6	114	1-20th	103	34 20
Prelude	April 17	60	June 20	Aug. 12	117	1/4	272	18 0

In all, six different varieties of wheat were tried, and produced from 60 bushels per acre in the case of Marquis to 18 bushels with the Prelude. It will be noted that, with the exception of Prelude, all the yields are very good, and in the case of the Durum, Huron, and Marquis varieties are quite exceptional. The yield of 60 bushels in the case of the Marquis wheat deserves special mention, as this yield compares favourably with the best of the wheat yields on the Prairie. In addition to this, the Marquis is regarded as one of the best milling wheats grown. Just why the Prelude should produce only 18 bushels per acre is somewhat hard to explain, because the same wheat on the Quilchena Farm produced the splendid yield of 37 bu. 52 lb. per acre. This variety will be tried again next year as it is a valuable milling wheat, and in addition has the distinction of taking fewer days to mature than most other varieties. Both points are important in desirable wheat for the 105-Mile District. In the case of Galgalos, we have another good milling wheat, and, as will be noted from the table above, a wheat that matures in the shortest time of any of those tried. In fact, the Prelude is supposed to be our earliest Canadian wheat, but, as will be seen, the Galgalos matured in even less time than did the Prelude. The Galgalos wheat was imported by the writer from Northern Montana, where on the State Experimental Farm it has given very favourable results for the past two years. The success of the Marquis, Red Fife, Galgalos, and Huron varieties augurs well for the 105-Mile District as a successful wheat-producing area.

"DATE OF SEEDING" EXPERIMENT.

Some of the yields recorded last year suggested the necessity of trying some experiments to determine, if possible, the proper date for the seeding of wheat, oats, and barley. A table follows covering a "date of seeding" experiment for wheat. For this experiment the Ghirka wheat was used. It may be remembered that the Ghirka wheat produced our largest yield last year—viz., 32% bushels. This wheat was secured two years ago from the Montana Agricultural Experimental Station and had given good results in the dry belt of Northern Montana. That it is adapted to the conditions at 105-Mile House is evidenced by the splendid yields recorded below.

Table 4.—Date of Seeding with Ghirka Wheat.

Date seeded.	Rate of seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
	Bu.				Acre.	Lb.	Bu. lb.
April 10	1	June 30	Aug. 24	136	1/4	420	28 0
" 17	1	July 1	" 24	129	1/4	437	29 8
" 24	1	" 3	" 24	122	1/4	730	48 40
May 1	1	" 8	" 25	116	1/4	722	48 8

The first plot was seeded April 10th and the other plots were seeded at one-week intervals until four plots were seeded. All plots were seeded at the rate of 1 bushel per acre. The yields of the first three plots are in the order of the date of seeding, with a very decided advantage in

avour of the April 24th seeding. The result from the May 1st seeding produced almost as much in yield as the April 24th seeding. It would appear from the above that a seeding date prior to April 17th is not at all suitable to conditions at 105-Mile House. By glancing at the "days to mature" column it may be noted that they are just the opposite of the "date of seeding." In fact, there is an astonishing regularity in the drop of seven days in the time required to mature any one plot as compared with the time to mature the plot that was seeded one week previously. So that we might infer from the above results that, in so far as 1915 is concerned, some date between April 29th and May 1st would be about the best time to seed wheat.

RATE OF SEED PER ACRE.

This experiment was also tried with Ghirka wheat. All four plots were seeded on April 15th, and all took the same number of days to mature.

Table 5.—Rate of Seed per Acre with Ghirka Wheat.

Date seeded.	Rate of Seed per Plot.	Rate of seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
April 15	lb.	Bu.				Acre.	lb.	Bu. lb.
April 15	7½	½	July 2	Aug. 25	132	¼	717	47 40
" 15	11½	¾	" 3	" 25	132	¼	745	49 40
" 15	15	1	" 2	" 25	132	¼	703	51 0
" 15	17	1¼	" 2	" 25	132	¼	701	50 40

The four plots were seeded as follows: ½, ¾, 1, and 1½ bushels per acre; and while there is not as great a difference in the yields as might be expected, yet these arrange themselves almost in the order of the rate of seeding. All yields are exceptionally good for dry-land results, and what little advantage there is seems to be in favour of a seeding at the rate of 1 bushel per acre. Experiments such as these, however, are valuable just in proportion to the number of years that are represented in the results.

VARIETY TEST WITH OATS.

In this experiment three varieties of oats that gave good results last year were tried. The following table will give the results of the experiment:—

Table 6.—Experiments with Three Varieties of Oats on ¼-acre Plots.

Variety of Oat.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
		lb.				Acre.	lb.	Bu. lb.
O.A.C. No. 72 ..	April 28	68	July 8	Aug. 17	111	¼	815	96 0
American Banner ..	" 28	52	" 10	" 18	112	¼	748	88 0
Abundance	" 28	60	" 8	" 23	117	¼	741	87 6

The yields this year are larger than those of last year. In fact, the three yields recorded above would stand as exceptional yields under any condition.

LARGER EXPERIMENT WITH OATS.

The three varieties of oats mentioned in the above table, together with a Sixty-day oat, were tried on a larger scale. In this experiment the Abundance, O.A.C. 72, and Sixty-day oats were each seeded on a 3-acre plot, while 5 acres were used for the seeding of the Banner oat. As might be expected, the yields are not as large as those produced on the smaller areas, yet the results are very good indeed.

Table 7.—Experiment with Larger Areas of Oats.

Variety of Oat.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Banner	April 30	Bu. $1\frac{1}{2}$	July 13	Aug. 23	115	5	310	62 0
Sixty-day	May 4	$1\frac{1}{2}$	" 1	" 8	93	3	174	58 0
O.A.C. No. 72 ..	" 5	$1\frac{1}{2}$	" 8	" 22	100	3	153	51 0
Abundance	" 7	$1\frac{1}{2}$	" 12	" 22	107	3	139 $\frac{1}{2}$	46 17

It will be noted that all four varieties were seeded at the same rate per acre, and, in addition to this, were seeded from two to nine days later in the spring than were the plots recorded in Table No. 6 above. We think, perhaps, that the later seeding may account somewhat for the smaller yields obtained, but we will have something to say on this point later when the results of our "date of seeding" experiments are recorded. The above table also shows that the same varieties grown on a larger plot mature in from two to ten days less time. Special attention is called to the Sixty-day oat recorded in the above table. This oat was also imported by the writer from the dry areas of Montana two years ago. It produced 38 bushels per acre in 1914 and 58 bushels during the past summer. While the above yields are perhaps not large, yet for a dry-land area and for larger plots they are indeed good yields.

"DATE OF SEEDING" EXPERIMENT.

For the experiment regarding the "date of seeding" of oats the New Market variety was selected. This variety was grown last year on a 17-acre field and produced 39 bushels per acre. Each plot was seeded at the rate of $1\frac{1}{2}$ bushels per acre. The first plot was seeded on April 15th, and another plot seeded one week later, and this was continued until all five plots were sown. As will be noted from the following table, the dates of seeding were as follows: April 15th, 22nd, 29th, May 6th and 13th.

Table 8.—"Date of Seeding" Experiment with New Market Oats.

Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
April 15	Bu. $1\frac{1}{2}$	July 1	Aug. 18	125	$\frac{1}{4}$	800	94 4
" 22	$1\frac{1}{2}$	" 4	" 18	118	$\frac{1}{4}$	900	105 30
" 29	$1\frac{1}{2}$	" 10	" 26	119	$\frac{1}{4}$	818	96 8
May 6	$1\frac{1}{2}$	" 17	" 31	117	$\frac{1}{4}$	720	85 26
" 13	$1\frac{1}{2}$	" 20	" 31	110	$\frac{1}{4}$	706	83 2

It will be noted that the plots seeded on April 22nd matured in seven days less time than did the one which had been seeded one week earlier. The plots seeded April 22nd, 29th, and May 6th all took practically the same time to mature, while that which was seeded on May 13th actually matured seven days earlier than that which was seeded one week earlier, but the yield for the last-sown plot is the smallest of all. In the yields per acre, which is really the important consideration, the plot seeded April 22nd gave the best returns in the enormous yield of 105 bu. 30 lb. per acre. The yields from the plots seeded April 29th, May 6th, and May 13th are in the exact order of the date of seeding, producing 96 bu. 8 lb., 85 bu. 26 lb., and 83 bu. 2 lb. respectively. So that from the above experiment and for the year 1915 April 22nd seems to be about the best date for the seeding of oats.

"RATE OF SEEDING" EXPERIMENT WITH OATS.

It was also thought advisable to try a "rate of seeding" experiment with oats. The New Market variety was used in this test and the results were as follows:—

Table 9.—“Rate of Seeding” Experiment with Oats.

Date seeded.	Rate of Seed per Plot.	Rate of seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
						Acre.	Lb.	Bu. lb.
April 24	10½	1¼	July 1	Aug. 19	117	¼	460	53 0
“ 24	12½	1½	“ 1	“ 19	117	¼	416	49 0
“ 24	15	1¾	“ 1	“ 19	117	¼	816	96 0
“ 24	17	2	June 29	“ 21	119	¼	725	81 10
“ 24	19	2¼	“ 29	“ 21	119	¼	651	76 17

In the above experiment the five plots were all seeded on the same day at the rate of 1¼, 1½, 1¾, 2 and 2¼ bushels per acre. It will be noted that 1¾ bushels per acre seems to give the best results, and while the 2- and 2¼-bushel rates of seeding give first-class returns, yet they do not compare with the 1¾-bushel seeding. The 1¼- and 1½-bushel rates seem to be entirely too light to suit conditions at 105-Mile House. This experiment shows clearly the necessity for a knowledge of the most suitable rate to seed per acre, because in the one case we may seed so light that we do not make full use of the stored-up moisture in the soil, and in the other case we seed too heavy for the stored-up moisture, and not only waste seed in the seeding, but actually cut down the final yield per acre.

BARLEY RESULTS.

Only three different varieties of barley were tried—the Smyrna, White Hull-less, and Mensury. Two of these were seeded on May 17th and the White Hull-less on May 21st. There was no particular motive in testing these barleys out in a comparative way, because they are very different in many respects. For instance, the White Hull-less is, as its name implies, a barley that hulls out just like wheat at threshing-time. The Mensury is a six-rowed variety. Both the Mensury and White Hull-less were tried last year and only gave us fair results.

Table 10.—Yields from Three Varieties of Barley.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
						Acre.	Lb.	Bu. lb.
Smyrna	May 17	1	July 8	Aug. 18	93	1-10th	285	59 18
White Hull-less	“ 21	1¼	“ 18	“ 26	97	¼	648	54 0
Mensury	“ 17	1½	“ 12	“ 20	95	¼	607	50 28

The Smyrna barley, which appears at the head of the list, is a new variety received from Professor Atkinson, who is in charge of dry-land investigational work in the State of Montana. A small 5-lb. package of this sample was received, and the results are estimated from the actual yield from a $\frac{1}{10}$ -acre plot. This barley has given splendid results in Montana, and apparently will suit the dry areas of British Columbia. It grew rapidly and, as will be noted, matured in less time than either of the other varieties. Mention is made particularly of the White Hull-less variety that produced 54 bushels per acre. This barley only produced 9 bu. 28 lb. last year, and it is remarkable that the yield should be so very large for the past summer. It will be well to introduce a “date of seeding” and “rate of seeding” test for this variety, as its success means much in the way of stock-feeding for settlers who may come into the district. This year’s results promise well for White Hull-less barley.

DATE OF SEEDING WITH TWO-ROWED CHEVALIER BARLEY.

The Two-rowed Chevalier barley produced the best results last year, and all the seed produced was saved for a “date of seeding” experiment in 1915. During the past summer

this variety has again produced more largely than any other variety. In fact, it leads any other variety by 7 bu. 18 lb.

Table 11.—Result of "Date of Seeding" Experiment with Two-rowed Chevalier Barley.

Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
May 7	Bu. $1\frac{1}{4}$	July 8	Aug. 25	110	Acre. $\frac{1}{4}$	Lb. 801	Bu. lb. 66 36
" 14	$1\frac{1}{4}$	" 10	" 27	105	$\frac{1}{4}$	692	58 0
" 21	$1\frac{1}{4}$	" 16	Sept. 4	106	$\frac{1}{4}$	650	54 0
" 28	$1\frac{1}{4}$	" 19	" 4	99	$\frac{1}{4}$	603	50 0

It will be noted that the yields per acre are in the exact order of the date of seeding per acre. There is a difference of eleven days in the time required to mature the 66-bu. 36-lb. crop and that required to mature the 50-bushel crop, but the longer time required to mature the former plot produced 16½ bushels more per acre than in the latter case. It is apparent that in this experiment, and also in the "date of seeding" experiment with oats, the plots that were seeded late in the spring and which, therefore, matured in a comparatively short time have produced lower yields than those that were seeded earlier, and consequently required more days to mature. One of the chief reasons for this is no doubt the fact that crops that are started as early as possible in the spring have ample moisture for growth and are well grown by the time the warm weather comes on. By this time the crop itself has grown to such an extent that it shades the ground and thereby prevents evaporation. It thus saves for the final maturing of the crop the soil-moisture which might otherwise be lost by evaporation.

EXPERIMENT WITH FIELD-PEA.

Two varieties were tried—the Canadian Beauty and the Prussian Blue. The seed was home-grown, and the plots produced as follows:—

Table 12.—Test with Two Varieties of Field-peas.

Variety.	Date seeded.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Canadian Beauty	May 21	Sept. 15	117	Acre. $\frac{1}{4}$	Lb. 159	Bu. lb. 10 36
Prussian Blue	" 21	" 20	122	$\frac{1}{4}$	114	7 30

Both varieties were seeded on the same day, but it required five days more time to mature the Prussian Blue than was necessary in the case of the Canadian Beauty. The yields are not by any means large, but the quality of the grain is excellent.

FLAX.

The Premost flax was the only variety tried. The seed was received from the Quilchena Station, where it had done fairly well. It may also be remembered with interest that the plague of grasshoppers which visited the Quilchena Station in 1914 scarcely injured this variety of flax at all. The Premost flax was seeded on May 21st, was cut September 4th, thus requiring 106 days to mature. It produced 115 lb. on a $\frac{1}{4}$ -acre plot, or at the rate of 7½ bushels per acre. This is not a large yield, and yet the flax is of sufficient value to warrant it being tried under various conditions another year.

SHEEP-PASTURE EXPERIMENT.

Numerous plots were seeded on both the Quilchena and 105-Mile Farms to various kinds of grasses and legumes. On the Quilchena Farm the crops were cut for hay. The results will appear at the proper time under the Quilchena report. At 105-Mile House the plots of grasses and legumes were used as pasture for sheep. There were eight sheep in the flock, which averaged 132.2 lb. each, or a total of 1,058 lb. The pasturing on the various plots was as follows: May 14th to 29th, on $\frac{1}{4}$ acre of brome-grass; May 29th to June 20th, on $\frac{1}{4}$ acre white clover and $\frac{1}{4}$ acre common red clover; June 20th to July 20th, on $\frac{1}{4}$ acre of alsike and $\frac{1}{4}$ acre mammoth red clover; July 20th to August 1st, on $\frac{1}{4}$ acre alfalfa; August 1st to 12th, on $\frac{1}{4}$ acre brome-grass and $\frac{1}{4}$ acre rape.

As the sheep were moved back on to the brome pasture for the second time on August 1st the total area represented in the pasture experiment amounts to $1\frac{1}{4}$ acres. The beginning weight of the sheep was 1,058 lb. and the finishing weight, 1,430 lb., thus representing a production of 373 lb. of mutton on $1\frac{1}{4}$ acres. At the exceedingly moderate estimate of \$7.75 per hundred, the 373 lb. represents a value of \$28.80 for $1\frac{1}{4}$ acres, or \$16.51 per acre. These figures are slightly under those of last year for the sheep-pasture experiment, but the character of the sheep will easily account for the difference. The 1915 sheep were not by any means as good a class of feeders as were those secured during 1914. However, they were the only sheep that we could get, and consequently we had to do what we could with what was available. This pasture experiment will be continued.

TIMOTHY CROP.

During the early summer of 1914 some land was broken on a lower portion of the farm and within a short distance of Watson Lake. This ground was given special care in the way of cultivation, and by August the sod seemed to be well decomposed and a very excellent tilth was secured. Timothy was seeded on this land at the rate of 6 lb. per acre. It may be remembered that the latter part of the summer of 1914 was quite dry, and though the timothy-seed sprouted, yet the growth that it made during the fall was quite disappointing. It did not seem to stool out and thus produce a fair growth the first season. However, it came through the winter well and was harrowed early in the spring to loosen the soil surface and hold the moisture. It grew well and at haying-time produced a rather remarkable crop of timothy-hay. In all, there were some 12 acres seeded to timothy, and the measured stack showed a crop of 16 tons, or at the rate of $1\frac{1}{3}$ tons per acre. This is an excellent showing on dry land with only 15.05 inches of rainfall. It will be of much interest to see how the crop will produce during next season.

VEGETABLES.

There is perhaps nothing new to report regarding the success of the vegetables tried at 105-Mile House. Practically every vegetable that was grown produced splendid returns. In fact, the vegetable-garden at 105-Mile House looked just like any other well-kept and productive garden that one might find. The vegetables that did well include all the staples, such as turnips, beets, peas, rhubarb, parsnips, radish, lettuce, cabbage, cauliflower, carrot, etc.

POTATOES GROWN AT 105-MILE HOUSE.

Three varieties of potatoes were tested out on $\frac{1}{4}$ -acre plots, and one variety was grown on a $\frac{1}{16}$ -acre plot. The results were as follows:—

Table 13.—Comparison of the Yields of Four Varieties of Potatoes.

Variety.	Date seeded.	Date above ground.	Date lifted.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Beauty of Hebron	May 28	June 20	Oct. 14	141	$\frac{1}{4}$	751	100.1
Duke of York	" 27	" 16	" 14	140	$\frac{1}{4}$	698	92.8
Sharp's Victor	" 28	" 16	" 13	140	$\frac{1}{4}$	630	73.8
Gold Mine	" 27	" 19	" 13	139	1-12th	360	73.8

It should be mentioned that the yields here recorded are of marketable potatoes, as all small non-marketable potatoes were eliminated before the weights were taken. The yields are very fair and the quality of the potatoes for table use cannot be excelled. There is no doubt about the fact that excellent potatoes may be grown in the 105-Mile District on the dry-land areas, and that the growth of marketable yields as reported above will mean much to those who may eventually take up land in this district.

QUILCHENA REPORT.

PREPARATION OF THE SOIL AT QUILCHENA.

Generally speaking, the same method was followed at Quilchena as at 105-Mile House in the preparation of the land. Some 40 acres were broken during the summer of 1914. This newly broken land was thoroughly cultivated and ridged with the disk in a similar manner to that at 105-Mile House. In the spring of 1915 a stroke of the harrow reduced the ridges to the common level of the ground and our seed-bed was ready.

SPRING CONDITIONS AT QUILCHENA.

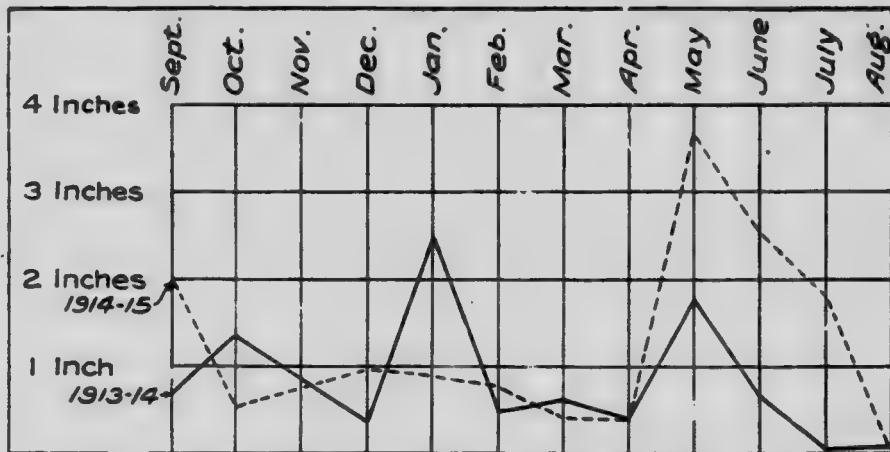
The precipitation records for Quilchena are very close to those for 105-Mile House. The figures from September 1st, 1914, to August 31st, 1915, for each farm are: Quilchena, 15.203 inches; 105-Mile House, 15.05 inches. We shall herewith submit a table showing a comparative monthly record of the precipitation at the Quilchena Station, covering the year September 1st, 1913, to August 31st, 1914, as compared with the year September 1st, 1914, to August 31st, 1915:

Table 14.—Precipitation Table, covering Corresponding Months in 1913-14 and 1914-15.

Month.	Precipitation from Sept. 1st, 1913, to Aug. 31st, 1914.	Precipitation from Sept. 1st, 1914, to Aug. 31st, 1915.	Month.	Precipitation from Sept. 1st, 1913, to Aug. 31st, 1914.	Precipitation from Sept. 1st, 1914, to Aug. 31st, 1915.
September	0.71	1.902	April	0.51	0.48
October	1.36	0.45	May	1.76	3.72
November	0.96	0.757	June	0.75	2.52
December	0.40	0.97	July .....	...	1.88
January	2.61	0.85	August	0.02	0.314
February	0.58	0.7	Totals	10.34	15.203
March	0.7	0.50			

Here again those who expected that the 1914-15 rain records would reveal a precipitation that was greatly in excess of that of 1913-14 were disappointed. As is the case at 105-Mile House, there is a larger rainfall, but not nearly as large as was anticipated. True, the records show that we had 4.863 inches more in 1914-15 than in 1913-14, yet it must be remembered that the rain recorded for Quilchena for 1913-14—viz., 10.34 inches—is an exceedingly small rainfall, and that a rainfall that is even as much as 15.203 inches is still regarded as a very limited precipitation. It is somewhat of a generally accepted fact in irrigation districts that where the precipitation falls below 20 inches it is then advisable to prepare for irrigation. This year, at Quilchena and 105-Mile House, when every one thought that we were getting such an abundance of rain that we might be classed as "wet areas," we are still approximately 5 inches below the mark where it is thought that irrigation is regarded as necessary. We shall submit the above table in the form of a diagram, so that the precipitation at the various times of the year may be more clearly seen. In the following diagram the 1913-14 precipitation will be indicated by a straight line, while that for 1914-15 will appear as a dotted line:—

Chart 2.—Showing Diagram of Precipitation, Records from September 1st, 1913, to August 31st, 1914, as compared with September 1st, 1914, to August 31st, 1915.



Generally speaking, the two precipitations represented in the above chart are much alike from September to April, with the one exception of the month of January. During January, 1914, the precipitation reaches 2.61 inches as compared with 0.85 inch in January, 1915. The general tendency of the two lines for May, June, July, and August is much the same, although the 1914-15 rainfall is considerably more than that of 1913-14. The 1914-15 chart confirms last year's (1913-14), in that there is much more rain in the summer months, when the grain needs it for filling, than at any other time of the year. This fact is very significant as far as the possibility of producing crops is concerned, because of the opportuneness of the rain. For it is a well-recognized fact that a district may do with a very much lighter rainfall if the rain that does come falls during the growing and filling months of the grain. This is a similar condition to that found at 105-Mile House, and augurs well for the success of both districts.

COMPARATIVE TEMPERATURE TABLE FOR QUILCHENA.

In the table below the average monthly maximum and minimum temperatures are given, as well as the average highest and lowest monthly temperatures. These are recorded for the two years, September 1st, 1913, to August 31st, 1914, and September 1st, 1914, to August 31st, 1915.

Table 15.—Average Temperatures for Corresponding Months during 1913-14 and 1914-15.

Month.	Average Daily Maximum.		Average Daily Minimum.		Highest Temperature during Month.		Lowest Temperature during Month.	
	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.
September	61.0	57.5	37.7	39.7	72.0	74.0	27.0	31.0
October	49.0	51.7	32.1	32.5	70.0	68.0	18.0	22.0
November	37.7	36.9	23.9	23.5	50.0	53.0	14.0	3.0
December	29.7	21.4	15.3	10.6	38.0	33.0	Zero	— 9.0
January	33.3	28.9	17.6	9.6	52.0	37.0	— 8.0	— 8.0
February	32.6	35.4	14.3	18.3	44.0	45.0	— 26.0	7.0
March	41.2	43.4	22.2	25.0	53.0	55.0	— 10.0	11.0
April	52.1	54.1	31.8	32.1	68.0	67.0	16.0	8.0
May	58.9	56.1	36.5	37.6	72.0	72.0	30.0	29.0
June	65.8	61.8	40.5	40.8	93.0	74.0	29.0	34.0
July	75.1	68.5	47.7	46.8	92.0	82.0	37.0	39.0
August	74.1	76.4	45.8	48.9	87.0	85.0	32.0	40.0
Average ..	50.8	49.1	30.4	30.35	65.9	61.9	13.4	17.2

A glance at the above will show that there is not a great deal of difference between the average temperatures for 1913-14 and 1914-15. However, the average day temperature for 1913-14 is slightly higher than that for 1914-15. There is also a very slight advantage in favour of the night temperature for 1913-14 as compared with 1914-15. It will also be noted that the winter of 1913-14 was considerably colder than the winter of 1914-15. During four months of the former the thermometer reached zero or below, while it only went below zero during two months of the latter.

CROPS GROWN AT QUILCHENA.

Much the same kind and number of experiments were undertaken at Quilchena as were tried at 105-Mile House. There was this exception, however, that different grains were used for the "date of seeding" and "rate of seeding" tests. All the tables submitted, giving the results of the various grain tests, will include variety of grain, date seeded, rate of seed, date headed out, date cut, days to mature, size of plot, yield per plot, and yield per acre.

TESTS WITH VARIOUS WHEATS.

In this experiment a variety of wheats have been tried, the purpose being to select those that seem to be particularly suited to the Quilchena District. Among the wheats grown are some that are known as first-class milling varieties. It will be noted that the three wheats that stand at the head of the list in the matter of production come under the head of good milling varieties.

Table 16.—Yields from Various Varieties of Wheat.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
		Lb.				Acre.	Lb.	Bu. lb.
Ghirka	April 21	60	July 21	Sept. 6	138	1/4	724	48 16
Red Fyfe	" 21	75	" 26	" 11	142	1/4	721	48 4
Marquis	" 21	60	" 21	" 2	134	1/2	1314	43 48
Huron	" 21	60	" 21	Aug. 25	126	1/4	648	43 48
Durum	" 21	45	" 20	Sept. 10	142	1/4	630	42 0
Prelude	" 21	60	" 8	Aug. 19	125	1/4	568	37 52
Kubanka	" 23	60	" 19	Sept. 6	136	1/4	553	36 52
Galgalos	May 12	48	Aug. 10	" 15	126	1-16th	111	29 36

Of the varieties tried the Ghirka heads the list, as it did at 105-Mile House in 1914. Red Fyfe is second and Marquis third in point of yields. This is a first-class showing and speaks well for the adaptability of the Quilchena District for the production of desirable wheats, as all three are splendid milling varieties. Two other varieties that are regarded with favour as milling wheats are the Prelude and Galgalos. The Prelude occupies the same position this year as it does at 105-Mile House, which is only sixth place. It may be that this particular variety may need to become more acclimated to the district; thus we may obtain better results from our own home grown seed. The Galgalos seed was secured in Northern Montana, but was received too late in the spring to give it a fair chance in the above test. It will be noted that it was seeded on May 12th, or twenty-one days after the seeding of the rest of the varieties. Another point that is worth while noting is the fact that it requires an average of 122.5 days to mature the Marquis, Huron, Durum, Red Fyfe, Galgalos, and Prelude at 105-Mile House, as compared with an average of 129.1 days for the same varieties at Quilchena. This is a surprising fact when it is remembered that the 105-Mile House Station is so much farther north than is the Quilchena Farm. Farther on in this report will be found a record covering the germination of all grains at Quilchena. It will be noted the very excellent vitality of all wheats listed.

" RATE OF SEEDING " TEST.

In this experiment the Red Fyfe variety of wheat was used. Four plots were each seeded on the same day, and the seed used was at the rate of $\frac{1}{2}$, $\frac{1}{4}$, 1, and $1\frac{1}{4}$ bushels per acre.

Table 17.—"Rate of Seeding" Test with Red Fife Wheat.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Red Fife	April 21	Lb.	July 26	Sept. 11	144	Acre.	Lb.	Bu. lb.
		30					700	47 16
		45		" 26	" 11		686	45 44
		60		" 26	" 11		706	47 4
		72		" 26	" 11	144	721	48 4

In the above table there is only a difference of 2 bu. 40 lb. between the highest and lowest yields. In addition to this, all plots matured in the same number of days. While the 1½-bushel seeding seems to give the best results in this test, yet we do not feel justified in drawing anything in the nature of a definite conclusion from the above figures. The same experiment will be tried next year, and we shall hope for more conclusive results. There is this to be said, however, that all four results shown under this test are very good indeed, and would be creditable yields under conditions where moisture was abundant.

TEST WITH VARIOUS OATS.

The same purpose was in mind in testing out the varieties of oats as was the case in the testing of the wheat—viz., the determining of the varieties best adapted to the Okanagan District. In all, six varieties were tried, and the following gives in a tabulated form the results obtained:—

Table 18.—Test with Various Kinds of Oats.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
		Lb.						
Garton No. 22	April 23	76	July 27	Sept. 2	132	1/4	780	91 26
Abundance ...	" 23	59 1/2	" 21	Aug. 31	130	1/4	775	91 6
O.A.C. No. 72	" 23	68	" 21	" 26	125	1/4	763	88 26
Regenerated								
Abundance...	" 23	68	" 21	" 31	130	1/4	684	80 16
Banner	" 23	51	" 29	" 31	130	1/4	727	85 13
Sixty-day	" 23	51	" 12	" 14	113	1/4	716	64 8

In the above table two varieties of oats produced 90 bushels or better per acre, three varieties produced 80 bushels or better per acre, and only one variety fell below the 80-bushel point—viz., the Sixty-day oat, with 64 bu. 8 lb. per acre. However, when the number of days required to mature this oat is considered, the reason for the comparatively light yield is seen at once. This is a very early ripening oat, and, as a matter of fact, ripened 16.4 days earlier than the average of all the rest of the varieties. All yields, however, are good. If the Sixty-day variety is eliminated, the other five are exceptional indeed. They would be considered as very considerably above the average produced under most favourable conditions. Even if the first five exceptional yields were eliminated, then the yield of 64 bu. 8 lb. would not be by any means regarded as a small yield. In fact, it would be a very creditable yield under ordinary circumstances.

"RATE OF SEEDING" TEST WITH OATS.

In this test the Garton No. 22 oat was used. All six plots were seeded on the same day and at the following rates: ¾, 1, 1½, 1¾, 1½, and 2 bushels per acre. The Garton No. 22 oat tried in this experiment was a new variety introduced into this experimental work for the first time.

Table 19.—"Rate of Seeding" Test with Garton No. 22 Oat.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Garton 22	April 23	25½	July 27	Aug. 31	130	Acres.	Lb.	Bu. lb.
"	" 23	34	" 27	" 31	130	¼	707	83 8
"	" 23	42½	" 27	" 31	130	¼	700	82 12
"	" 23	51	" 27	" 31	130	¼	649	72 12
"	" 23	59½	" 27	" 31	130	¼	644	75 26
"	" 23	68	" 27	Sept. 1	132	¼	771	90 24
							780	91 26

The above six plots were all seeded on April 23rd, and the results would rather indicate that the heavier seeding has given the best results. It is a surprising fact, however, that the ¼- and 1-bushel seedings produced better results than the 1½- and 2½-bushel seedings. This somewhat interferes with the theory of the heavier seeding producing uniformly better results. It is simply another case where an accurate statement can only be deducted after years of experimentation. An important point to be observed is the fact that all yields reported are very good indeed for dry-land conditions, and further substantiates the contention that these areas may ultimately be used profitably for farming purposes.

NINE-ACRE BULK CROP OF OATS.

To test the possibility of oat production in even a more convincing manner a 9-acre field was seeded to Garton No. 22. This field was seeded three days after the plots of the above table, and matured in 123 days, or in seven days less time than the average of the plots recorded under Table 18. The field produced a total of 727 bushels, or on an average 80 bu. 7 lb. per acre. This is certainly an enormous yield for a field of this size. The field was seeded at the rate of 1½ bushels per acre.

TEST WITH VARIOUS BARLEYS.

In all, four different varieties of barley were tried. The same statement may be made with reference to the Quillchena test as was made regarding the 105-Mile House experiments, to the effect that the varieties of barley tested were so different in character that no particular thought was given to comparative yields from each. The experiment was simply to test different varieties.

Table 20.—Results of growing Various Barleys.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Smyrna	April 23	Lb. 40	July 6	Aug. 19	113	Acres. ¼	Lb. 510	Bu. lb. 87 24
Mensury	" 23	72	" 7	" 14	108	¼	1,015	84 20
Two-rowed Chevalier ...	" 23	72	" 10	" 26	125	¼	887	70 44
White Hull-less	" 23	40	" 12	" 10	113	¼	844	70 16

The Smyrna barley, which produced the largest yield, was imported from Montana, and as only a 5-lb. package was received it was seeded at a very light rate per acre, to give it ample opportunity to stool. It was therefore grown on a ¼-acre plot and produced at the rate of 87 bu. 24 lb. per acre. The yields of the Mensury and Two-rowed Chevalier are excellent, and like many of the results obtained at both stations, would be remarkable yields wherever secured. The yield of 70 bu. 16 lb. for White Hull-less is considerably above the average, and augurs well for the production of such grains as will be necessary for the feeding of live stock.

RATE OF SEED PER ACRE WITH BARLEY.

In this experiment four $\frac{1}{4}$ -acre plots were seeded to Two-rowed Chevalier barley at the rate of $\frac{1}{4}$, 1, $1\frac{1}{4}$, and $1\frac{1}{2}$ bushels per acre respectively. All plots were seeded on the same day and all were cut on the same day. The tabulated results are as follows:—

Table 21.—Results of Rate Seeding with Two-rowed Chevalier Barley.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Two-rowed Chevalier	April 23	Lb.	July 19	Aug. 20	125	$\frac{1}{4}$ Acre.	Lb.	Bu. lb.
		30					182	75 40
		48					874	72 40
		60					784	65 16
		72					897	76 44

The results as given above show that all rates of seeding gave excellent results, and while the 72 lb. or $1\frac{1}{2}$ bushels to the acre gave slightly the best results, yet it is not so very much greater than that obtained from the 30-lb. or $\frac{1}{4}$ -bushel seeding. Just why the 60-lb. seeding should give the poorest results is hard to explain. However, this particular plot is only slightly below the rest, and as all the results may be regarded as very good, we are therefore unable to draw any definite conclusions from the above. This experiment stands in the same position as do some others where it is impossible to deduce definite results from the first year's work. It will require the results of a series of years to give records that may be regarded as authentic and dependable. It is interesting to note the results of the above experiment in comparison with the one that follows. In both experiments our own home-grown seed was used. It will be noted that the experiment as given under Table 21 was seeded on April 23rd, while the first plot to be seeded in the following experiment was seeded two weeks later, or on May 7th. The three other plots in the following experiment were seeded respectively on May 15th, 22nd, and 29th, or at intervals of one week. The point to be noted here, however, is the fact that the earlier seeding (April 23rd) has given very much better results than any of the subsequent seedings.

DATE OF SEEDING WITH TWO-ROWED CHEVALIER BARLEY.

In this test four $\frac{1}{4}$ -acre plots were used and each was seeded at the rate of 60 lb. or $1\frac{1}{4}$ bushels per acre. As noted above, the four plots were seeded one each on May 7th, 15th, 22nd, and 29th, or just seven days apart.

Table 22.—Results of Date of Seeding Two-rowed Chevalier Barley.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Two-rowed Chevalier	May 7	Lb.	July 29	Sept. 11	127	$\frac{1}{4}$ Acre.	Lb.	Bu. lb.
		60					780	65 4
		60					670	56 28
		60					618	50 48
		60					792	66 0

It will be noted that the later the seeding the quicker the plots head out, and also the shorter time required to mature. For instance, there are seven days difference in the date of seeding of the May 7th and 15th plots, but there are only two days difference at the time of heading out, and at the time of ripening the May 15th plot had matured in eight days less time than the May 7th plot. If comparison is made of the seedings of May 15th and 22nd and those of May 22nd and 29th in the same manner, it will be found that the above facts may be applied more or less regularly throughout. It must, however, be borne in mind that a very short

ripening period is not always desirable. This will be seen in the case of the May 7th seeding, which required 127 days to mature as compared with 119 days in the case of the May 15th plot, yet the former produced 8 bu. 24 lb. more per acre than the latter. This is also true in comparing the May 15th and the 22nd seeding, but does not follow in the case of the May 22nd and 29th seedlings.

It is necessary to mention one thing in connection with the above experiment, and that is that the plots seeded on May 22nd and 29th were both injured somewhat by a frost that came on September 10th. The plots sown on May 7th and 15th were sufficiently mature so that the September 10th frost did no damage whatever, but the two later-sown plots were still somewhat green and consequently were slightly injured.

The last two tables submitted above would indicate that the proper time to seed barley is somewhere between April 23rd and May 15th. These two experiments will be conducted again next year for the purpose of establishing something that may be relied upon with a fair degree of accuracy.

EXPERIMENTS WITH TWO VARIETIES OF FIELD-PEAS.

The same two varieties of field-peas that were tried last year were again grown during the past summer. The Canadian Beauty pea was grown on a $\frac{1}{2}$ -acre plot, while the Prussian Blue was grown on $\frac{1}{6}$ acre. Both varieties were seeded on the same date, and the following is the result:—

Table 23.—Results obtained from Two Varieties of Field-peas.

Variety.	Date seeded.	Rate of Seed per Acre.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Prussian Blue	April 21	Lb. 60	Sept. 2	134	Acre. $\frac{1}{6}$	Lb. 327	Bu. lb. 27 15
Canadian Beauty	" 21	120	" 10	142	$\frac{1}{6}$	810	27 0

It will be noted that the Prussian Blue, which was seeded only at one-half the rate per acre that was used in connection with the Canadian Beauty, required less time to mature by eight days. With such a light seeding a very rank growth of vine and a prolonging of the date of maturity might easily have been expected. Yet, in spite of this fact, it was found that it requires only 134 days as compared with 142. The point is in its favour as a suitable variety for the Qu'Appelle District, for the tendency is for pea-vines to grow so late in the fall that they are caught with the early fall frosts. This fact is also true in the growing of peas on the Prairies. Consequently, those that require a short time to mature are eagerly sought after.

Both varieties above produced very good yields. In fact, the yield of 27 bushels per acre on a $\frac{1}{2}$ -acre plot is excellent for the Canadian Beauty. We are very much encouraged in the growing of peas on both the dry farms. The importance of this crop is apparent when we remember that pea-meal added to barley-chop makes a very excellent fattening food, particularly for hogs.

FLAX EXPERIMENT.

In this test only one variety, which was home-grown seed, was tried. It will be remembered that the grasshoppers failed to damage this particular variety seriously last year. It grew splendidly and produced very superior seed. In fact, the seed showed an official germination test of 100 per cent. The result from the growing of the Premost variety of flax was as follows:—

Table 24.—Results from Premost Flax Plot.

Variety.	Date seeded.	Rate of Seed per Acre.	Date headed out.	Date cut.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Premost	April 23	Lb. 30	July 21	Sept. 11	141	Acre. $\frac{1}{4}$	Lb. 254	Bu. lb. 16 56

The above flax is the latest developed variety in Canada, and is also one of the earliest maturing varieties. A yield of 16 bu. 50 lb. is very creditable indeed.

FALL RYE.

One plot of fall rye was sown on September 8th, 1914. It sprouted well and produced a very excellent growth during the same fall. The next spring it grew rapidly and was harvested on August 14th. The results from the fall rye plot are as follows:—

Table 25.—Results from $\frac{1}{4}$ -acre Plot of Fall Rye.

Variety.	Date sown.	Rate of Seed per Acre.	Date cut.	Size of Plot.	Yield per Plot.	Yield per Acre.
Fall rye	Sept. 8, 1914	Lb. 70	Aug. 14, 1915	Acre. $\frac{1}{4}$	Lb. 748	Bu. lb. 53 14

The fall rye produced 53 bu. 14 lb. per acre, which was a very large yield. There is no doubt about the fact that this crop will grow and produce excellent results on the Commonage. It may be used to good advantage as pasture in the fall, and still produce excellent returns the following year. It has also proven to be valuable as an early spring pasture. In some instances we have known it to be pastured until June 1st, and then allowed to mature and produce a fair amount of good seed.

GERMINATION OF GRAIN AT QUILCHENA.

Before turning to a discussion of the grasses, roots, and vegetables grown at Quilchena, an official germination test of the samples of grain grown on the various plots on the Quilchena Commonage is appended. It is found that 80.3 per cent. of all grains have a germination of 90 per cent. or better, which is regarded as very good indeed.

Table 26.—Complete Germination Record of all Grains produced at Quilchena.

	Percentage Germination.
Varieties of wheat—	
Marquis	99.5
Iluron	99.5
Red Fife	98.5
Prelude	97.0
Durum	97.0
Kubanka	94.5
Galgalos	88.5
Ghirka	84.5
Varieties of oats—	
Banner	90.5
O.A.C. No. 72	90.5
Sixty-day	90.0
Abundance (Regenerated)	98.0
Abundance	97.0
Garton No. 22	97.0
Varieties of barley—	
Two-rowed Chevalier	100.0
White Hull-less	97.5
Mensury	97.0
Smyrna	86.0
Varieties of peas—	
Canadian Beauty	94.5
Prussian Blue	93.0
Variety of flax—Premost	100.0
Variety of fall rye—Fall rye	99.5

In the germination results as given for the wheats it will be noted that all except two are above 94.5 per cent. In the case of Ghirka it is only 84.5 per cent. Just why this should be cannot be imagined, as the Ghirka wheat was seeded at the same time as the majority of the wheats, and was cut when fully matured on September 8th. The Galgalow shows a germination of 88.5. This in itself is not by any means exceptionally low, but may be accounted for by the fact that the Galgalow was received from Montana very late and was only seeded on May 12th. This, no doubt, partially accounts for the comparatively low germination test. If it had been seeded at the same time as the rest of the wheats, it is anticipated that the Galgalow would have had a vitality that would be just as high as the other varieties. This same variety has given very superior results in the dry-farm tests in Northern Montana. With the exception of these two varieties, the germination of the wheats is very creditable indeed.

All of the oats are over 97 per cent. germination, which is very exceptional. Three of the four barleys are over 97 per cent. in vitality. The Smyrna, which is only 86, was received from Montana late in the spring, and consequently has not had an equal chance with the rest of the barleys. The two varieties of pens have respectively a 93 and 94.5 per cent. germination, which is good; while the Premost flax with 100 per cent. and the fall rye with 95.5 per cent. are very excellent germination records.

TAME GRASSES AND LEGUMES.

It will be remembered that $\frac{1}{4}$ -acre plots were seeded to a variety of tame grasses and legumes, so that we might compare same in the matter of hay production. The following table will give the results obtained from the various plots:—

Table 27.—Results of Tame Grass and Legume Tests.

Variety.	Date seeded.	Date cut.	Size of Plot.	Yield per Plot.	Yield per Acre.
Timothy	April 18, 1914	July 10, 1915	$\frac{1}{4}$ Acre.	1.6.	6.400
Brome	" 21, "	" 7, "	$\frac{1}{4}$	2,325	9,300
Red-top	" 21, "	" 16, "	$\frac{1}{4}$	2,160	8,640
Mammoth red clover	" 18, "	" 16, "	$\frac{1}{4}$	1,534	6,136
Common red clover	" 18, "	" 16, "	$\frac{1}{4}$	1,237	4,950
Alisike	" 18, "	" 7, "	$\frac{1}{4}$	804	3,216
Alfalfa	" 18, "	" 16, "	$\frac{1}{4}$	671	2,684
				633	2,532

Most of the results for the various grasses and legumes are really remarkable, and are in fact much larger than anticipated. The above results are somewhat abnormal because of the fact that they are the first crop produced on land that was broken in 1913. This land was broken and thoroughly cultivated in 1913 and the grass-plots sown in the spring of 1914. On account of the grasshopper plague in 1914 the most of these plots were eaten down to the ground. They did not therefore grow very well, and consequently very little of the available plant-food in the soil was called for. Thus the crop of 1915, aided by opportune showers during the summer, found very congenial conditions for growth, and with the large amount of available plant-food ready to be taken up produced the large crops noted above. There was nothing abnormal in the method that was followed, either to cultivate for or to seed the grass and legume crops, but the grasshoppers prevented some of them growing in 1914, which saved both plant-food and moisture for the 1915 crop. We feel it necessary to make the above explanation to account for the very large yields recorded in the above table; and while we confidently expect to have good yields from our grass and legume plots next year, yet it would be beyond reason to expect yields comparable with the above. The yield from the timothy-plot is very exceptional for dry-land work, and it is rather surprising to see it larger than the brome-grass yield, which is also large. The red-top occupies its relative place in this list as a producer, as compared with timothy and brome-grass. Of the legumes, the mammoth red clover produced almost $2\frac{1}{2}$ tons per acre, which is very good indeed; the common red clover $1\frac{1}{2}$ tons, while the alisike and alfalfa produced slightly over $1\frac{1}{4}$ tons. The legume results are regarded as somewhat normal yields because of the fact that,

with the exception of alfalfa, they suffered comparatively little as a result of the grasshoppers in 1914. In fact, the grasshoppers did not seem to relish the alfalfa at all. As these legumes produced fair stands in 1914, the soil-moisture would be largely used up, and this would leave conditions for growth in 1915 almost normal. The yields from the four leguminous crops are very encouraging. If these grow successfully, the hay problem for the settler is practically solved.

SPRING RYE HAY CROP.

Heretofore we have had to draw all our hay for the work-horses on the Commonage from the Minnle Lake District, and as this hay had to be purchased it has been an expensive item. Last spring it was decided to sow 15 acres to spring rye, and by cutting it very early in the bloom intended to provide our own hay.

The success of this plan has been far beyond our expectations, for we cut and stacked one crop, and with an opportune rain or two a second crop came on, which was cut and produced about another one-fifth crop. To give some idea of the crop that was cut from this spring-rye field, the foreman in making a report said: "We are now cutting the spring rye, which is a bumper crop. The binder is being run wide open, with the reel in the top notch, and the knotter as far back as it will go." The crop at maturity stood over 5 feet high, and produced 32 loads all told on the 15 acres. The foreman had no means of weighing the rye, but is quite satisfied that it would yield easily 1 ton to the load, which would give a yield of over 2 tons to the acre. This rye is all properly stacked, and we think that we will have practically all the hay we shall need until next fall.

ROOTS AND POTATOES.

Several varieties of potatoes were grown. The Sutton's Reliance, Beauty of Hebron, Gold Coin, Duke of York, Early Ohio, and Sharp's Victor were tried in $\frac{1}{4}$ -acre plots, while Rennie's Reliance was tried on a $\frac{1}{2}$ -acre tract. The results were as follows:—

Table 28.—Results from Various Plots of Potatoes.

Variety.	Date planted.	Date above Ground.	Date lifted.	Days to mature.	Size of Plot.	Yield per Plot.	Yield per Acre.
Rennie's Reliance	May 15	June 25	Oct. 20	128	1-20b	520	10,520
Sutton's Reliance	" 11	" 21	" 16	124	$\frac{1}{4}$	1,047	6,008
Beauty of Hebron	" 11	" 21	" 16	124	$\frac{1}{4}$	1,578	6,312
Gold Coin	" 10	" 20	" 14	121	$\frac{1}{4}$	1,473	5,892
Duke of York	" 10	" 21	" 15	122	$\frac{1}{4}$	1,398	5,544
Early Ohio	" 10	" 21	" 15	122	$\frac{1}{4}$	1,144	4,576
Sharp's Victor	" 10	" 20	" 14	121	$\frac{1}{4}$	1,015	4,020

In comparing Rennie's Reliance with the rest of the varieties, some allowance will necessarily have to be made on account of the fact that it was grown on a much smaller plot than the rest. However, it is apparently a first-class variety. Of the other varieties, Sutton's Reliance holds first place, as it did last year. Beauty of Hebron again takes second place, which is the same as that occupied last year. The rest of the varieties vary considerably from the previous year's yields. While the above yields are not large, yet the quality of the potatoes grown on the Commonage is very excellent. The potatoes boil and bake well, producing a first-class mealy potato.

CARROTS.

At Quilchena two kinds of carrots were tried, the White Field and Red Table varieties. There were each grown on a $\frac{1}{4}$ -acre plot of ground.

Table 29.—Result of growing Two Varieties of Carrots.

Variety.	Size of Plot.	Yield per Plot.	Yield per Acre.	Yield per Acre.
White Field	Acre. 1-10th	Lb. 2,500	Lb. 25,000	Bu. 416.6
Red Table	1-10th	2,000	20,000	333.3

The above yields are very good indeed, and as the quality was excellent, it indicates what may be done on the Commonage in the way of roots. The field-carrots will be fed to the horses during the winter.

OTHER VEGETABLES.

To say much about the possibility of growing vegetables at Quilchena is to repeat what was said last year, and what has been said with reference to the possibilities of vegetable-growing at 105-Mile House. The simple fact of the matter is that all ordinary garden-vegetables grow excellently. Beets, onions, carrots, cabbage, cauliflower, beans, peas, turnips, etc., of good size and quality were exhibited at Nicola and Merritt. Those exhibited would do credit to any garden.

COMPARISON BETWEEN 105-MILE CONDITIONS AND THOSE AT QUILCHENA.

It is interesting to look at a few comparisons between the Quilchena and 105-Mile Districts. While the one district is considerably farther north than the other, yet there are conditions of climate, temperature, etc., that enter into the growth of crops, and the actual results are surprising, in that there seems to be a very great similarity in the conditions influencing the growth at the two points.

RAINFALL.

As has already been mentioned, the precipitation at both points is very much alike.

Table 30.—Tabulated Rainfall at Quilchena and 105-Mile House.

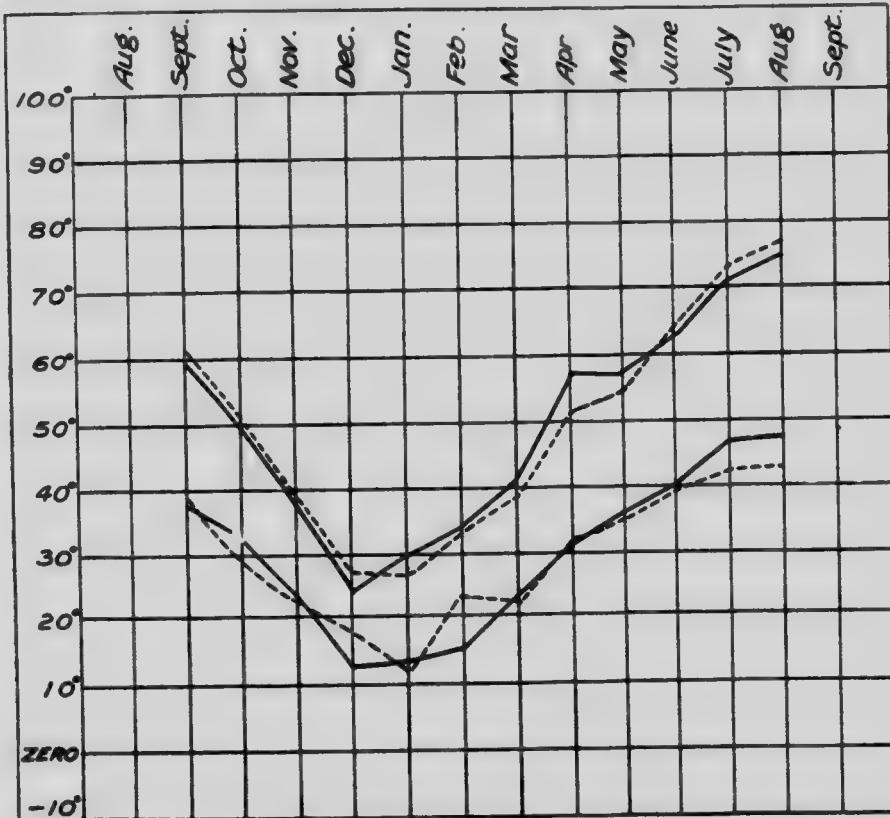
Month and Year.	Quilchena.	105-Mile House.
September 1, 1913, to August 31, 1914	10.34	10.94
" 1, 1914, to " 31, 1915	15.203	15.05
Total for two years	25.743	25.99

Thus, there is only a difference of 0.246 inch between the two districts in the total rainfall for two years.

TEMPERATURE.

A glance at the average daily maximum and minimum temperatures for both 105-Mile House and Quilchena will prove to be interesting. In striking the average for two complete years, we find the following: At 105-Mile House the average maximum temperature is 50.29 and the average minimum 30.1; for Quilchena the corresponding maximum and minimum averages are 49.9 and 30.37.

The following chart shows the average monthly maximum and minimum temperatures for the Quilchena and 105-Mile Stations for September 1st, 1913, to August 31st, 1914, and September 1st, 1914, to August 31st, 1915:—



The dotted lines show the average maximum and minimum temperatures, covering two years, at 105-Mile, and the straight lines show the averages at Quilchena.

From the above chart it will be seen what a very great similarity and uniformity there is in the temperatures at the Quilchena and 105-Mile Dry-land Stations.

GENERAL GROWTH OF GRAIN AT THE TWO STATIONS.

The following table is inserted to show the relative height of the grain grown at Quilchena and 105-Mile House. Samples were taken from all the growing crops on both farms during the first week in August, and a comparison was made of these crops as to general growth up to that time. The table will be found to give a comparison of the height of the grain at both stations. Where blanks appear among the grains, that particular variety was not tried at the particular station. In the matter of the blanks appearing for the grasses and legumes at 105-Mile House, it will be remembered that these plots were used for pasture purposes, and consequently no heights are given.

Table 31.—Showing Comparison of Height of the Grain growing at Quilchena and 105-Mile House during the First Week of August.

Varieties.	105-MILE HOUSE.			QUILCHENA.		
	Date seeded.	Days since seedling.	Height.	Date seeded.	Days since seedling.	Height.
Wheat—			Ft. in.			Ft. in.
Galgalos	May 15	79	4 2	May 12	85	3 3
Red Fyne	April 17	106	4 5	April 21	108	4 0
Marquis	" 22	106	4 6	" 21	102	4 3
Huron	" 17	108	4 3	" 21	107	4 3
Prelude	" 17	108	4 1	" 21	107	4 6
Ghirka	" 10	83	4 0	" 23	105	4 6
Ghirka	May 1	93	4 8	"	"	"
Durum	April 22	106	5 0	April 21	102	4 0
Kubanka	"	"	"	" 23	105	4 3
Averages	"	"	4 4	"	102½	4 1
Rye—						
Fall rye (green feed)	"	"	"	Sept. 8, '14	341	4 9
Spring rye	April 24	100	5 0	April 24	100	4 9
Oats—						
O.A.C. No. 72	April 28	96	4 9	" 23	104	4 9
Banner	" 28	96	4 4	" 21	106	4 3
Abundance	" 28	96	5 0	" 23	104	4 9
Regenerated Abundance	"	"	"	" 23	104	4 5
Garton No. 22	"	"	"	" 23	104	4 6
New Market	April 5	109	4 2	"	"	"
"	" 24	100	5 2	"	"	"
"	May 15	81	4 8	"	"	"
Averages	"	"	92	4 8	"	104
Sixty-day (Montana) (bulk crop)	May 4	90	4 6	April 23	104	4 0
Abundance (bulk crop)	" 7	87	3 6	"	"	"
Banner (bulk crop)	April 30	93	4 3	"	"	"
O.A.C. No. 72 (bulk crop)	May 5	89	4 3	"	"	"
Barley—						
Two-rowed Chevalier	May 7	87	4 0	April 23	71	4 6
Mensury	" 17	77	4 4	" 23	104	3 9
Smyrna	" 17	77	2 9	" 23	104	2 11
White Hull-less	" 21	72	3 4	" 23	104	3 9
Averages	"	"	78	3 7	"	96
Pears—						
Prussian Blue	May 21	72	4 6	April 21	106	4 9
Canadian Beauty	"	"	"	" 21	106	4 6
Flax—						
Premost	May 21	72	2 8	" 23	104	2 9
Grasses—						
Timothy (cut with mower)	"	"	"	July, 1914	"	3 2
Brome (cut, etc.)	"	"	"	"	"	4 4
Red-top (cut, etc.)	"	"	"	"	"	2 1
Legumes—						
Mann. th red clover (cut with mower)	"	"	"	"	"	2 1
Common red clover (cut with mower)	"	"	"	"	"	2 1
Alslike (cut with mower)	"	"	"	"	"	2 0
Alfalfa (cut with mower)	"	"	"	"	"	2 6

One peculiar fact may be noted in the above table, and that is the height of the grain in the same number of days or even in less time is greater at 105-Mile House than at Quilchena. This fact seems to be more or less uniform.

Another fact that is worthy of notice is that when the same variety of grain is grown at both stations, that grown at Quilchena is much more leafy than that which is grown at 105-Mile House. There was at least 50 per cent. more leaves on the former than on the latter, and this fact was quite evident with all varieties of wheat, oats, barley, peas, and flax.

SUMMER FROSTS AT BOTH STATIONS.

Table 32.—Comparison of the Dates on which Summer Frost occurred at Both Points.

	April.				May.				June.			
	105-Mile.		Quilchena.		105-Mile.		Quilchena.		105-Mile.		Quilchena.	
	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.
1									31			
2									31			
3									31			
4									31			
5									31			
6									31			
7									31			
8									31			
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30									31			
31									31			
	July.				August.				September.			
	105-Mile.		Quilchena.		105-Mile.		Quilchena.		105-Mile.		Quilchena.	
	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.
1												
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* Seeding begun.

A chart has been prepared showing the dates on which a degree or two of frost occurred during the crop-growing months—viz., from April until September. As a matter of fact, the crops were not sown until after the middle of April and were practically all harvested by September 1st, although some of the later-sown crops in the "date of seeding" experiment were harvested about September 10th.

Seeding commenced on April 17th at 105-Mile House and on April 21st at Quilchena. These dates were exactly nine days later at both places than in 1914.

After April 17th, when seeding commenced at 105-Mile House, from 2 to 7 degrees of frost was experienced every night until April 29th. Some of the grain was in the ground, but, of course, was not injured by the frost. Outside of April frosts at 105-Mile House, the few scattered summer frosts were much the same as last year. These were only a degree or two at a time, and so far as the growing crops were concerned, no evil effect was apparent at any time. In fact, the uniformly large crops produced on both farms is abundant evidence of the fact that these frosts do very little, if any, damage at all.

GENERAL SUMMARY.

Summing up the foregoing, as covering the results obtained in the actual growing of crops at Quilchena and 105-Mile House:—

(1.) There were six different varieties of wheat tried at 105-Mile House, with an average of a trifle over 48 bushels per acre for all varieties; and eight varieties at Quilchena, with an average of 40 bu. 4 lb. for all varieties grown. These yields are excellent. There was not a failure with a single wheat crop.

(2.) Three different varieties of oats were tried at 105-Mile House, which produced an average of 90 bu. 2 lb. per acre. Six varieties were tried at Quilchena, which produced an average of 80 bu. 8 lb. per acre. These yields are again very excellent, and there were no failures at all among the oat-crops.

(3.) Three different varieties of barley were grown at 105-Mile House, with an average of 51 bu. 15 lb. At Quilchena four varieties were grown, producing on the average 79 bu. 38 lb. Again, there were extra heavy yields and no failures whatever among the barleys.

(4.) Among the peas, flax, and fall rye crops, from fair to excellent results have been obtained.

(5.) Among the hays produced at Quilchena all the results are good and many are excellent.

(6.) At 105-Mile House the results from the pasturing of sheep have been good. The value of the mutton produced on an acre amounted to \$16.51.

(7.) Various varieties of potatoes were tried on both farms, and the results were very encouraging. The quality of the potato for table use was excellent.

(8.) All common vegetables have done splendidly on both farms.

After carefully considering results obtained at both 105-Mile House and Quilchena for the two years that work has been carried on, we cannot help but feel gratified at the results that have thus far been obtained. We further congratulate the Hon. W. R. Ross, Minister of Lands for the Province of British Columbia, in the fact that the results so far secured justify him in his opinion that these vast so-called dry areas of British Columbia may be of much more value to the Province than when used simply for range purposes.

W. J. ELLIOTT,
Adviser in Charge of Dry-land Investigation Work.

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